

CLAIMS

1. Compounds which bind the G-quadruplex structure of telomers, characterized in that they correspond to the following general formula:

5 nitrogen-containing aromatic ring - NR_3 - distribution agent - NR'_3 - aromatic ring

in which

• the nitrogen-containing aromatic ring represents:

10 ◇ a quinoline optionally substituted with at least one group $\text{N}(\text{Ra})(\text{Rb})$ in which Ra and Rb, which are identical or different, represent hydrogen or a short-chain C1-C4 alkyl and/or alkoxy radical and/or

15 ◇ a quinoline possessing a nitrogen atom in quaternary form or

 ◇ a benzamidine or

 ◇ a pyridine

• the aromatic ring represents

20 ◇ a quinoline optionally substituted with at least one group $\text{N}(\text{Ra})(\text{Rb})$ in which Ra and Rb, which are identical or different, represent hydrogen or a short-chain C1-C4 alkyl and/or alkoxy radical and/or

25 ◇ a quinoline possessing a nitrogen atom in quaternary form or

 ◇ a benzamidine or

 ◇ a pyridine or

- 5 ◊ a phenyl ring optionally substituted
 at the meta or para position with a
 halogen group, C1-C4 alkoxy group, cyano
 group, carbonylamino group optionally
 substituted with one or more C1-C4 alkyl
 groups, guanyl groups, C1-C4 alkylthio
 groups, amino groups, C1-C4 alkylamino
 groups, C1-C4 dialkylamino groups for
 each alkyl group, nitro group, alkylene-
 10 amino group or alkenyleneamino group or
 ◊ a mono- or bi- or tricyclic hetero-
 cyclic ring comprising 0 to 2
 heteroatoms per ring provided that at
 least one heteroatom is present in at
 15 least one ring optionally substituted
 with one or more C1-C4 alkyl groups or
 with alkylene or alkenylene groups
- 20 • R₃ and R'₃, which are identical or
 different, represent independently of one
 another hydrogen or a C1-C4 alkyl radical
 - 25 • the distribution agent represents:
 - ◊ a triazine group optionally
 substituted with an alkyl radical
 having 1 to 4 carbon atoms, a thio,
 oxy or amino radical which are
 themselves optionally substituted with
 one or more short-chain alkyl chains

containing 1 to 4 carbon atoms or a
halogen atom or

◊ a carbonyl group or

◊ a group $C(=NH)-NH-C(=NH)$ or

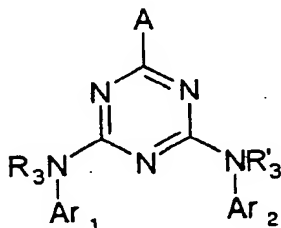
5 ◊ an alkyldiyl group containing 3 to 7
carbon atoms or

◊ a diazine group optionally substituted
with the same groups as the triazine
or one of its salts.

10 2. Compounds according to Claim 1,
characterized in that the distribution agent is chosen
from the triazine or diazine groups.

3. Compounds according to Claim 2,
characterized in that the diazine groups are
15 pyrimidines.

4. Compounds according to Claim 1,
characterized in that they correspond to formula (I)
below:



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in which:

- A represents

• an amino group of formula NR₁R₂ in

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which R₁ and R₂, which are identical or

different, represent hydrogen or a straight or branched alkyl group containing 1 to 4 carbon atoms or

• a group OR₁ or SR₁ in which R₁ has the same meaning as above or

• an alkyl group containing 1 to 4 carbon atoms or a trifluoromethyl group or

• a hydrogen atom or

• a halogen atom chosen from fluorine, chlorine, bromine or iodine

- R₃ and R'₃, which are identical or different, represent independently of one another hydrogen or a C₁-C₄ alkyl group

- Ar₁ and Ar₂, which are identical or different, represent

1. when Ar₁ and Ar₂ are identical:

• a quinoline motif optionally substituted with at least one group N(R_a)(R_b) in which R_a and R_b, which are identical or different, represent hydrogen or a short-chain alkyl and/or alkoxy radical containing 1 to 4 carbon atoms or

• a quinoline possessing a nitrogen atom in quaternary form or

• a benzamidine or

• a pyridine attached at the 4-position or fused with an aryl or heteroaryl

group optionally substituted with a
C1-C4 alkyl group

2. when Ar₁ and Ar₂ are different

- 5 • Ar₁ and Ar₂ both represent one of the possibilities mentioned above for Ar₁ and Ar₂ or
 - Ar₁ represents one of the above possibilities and Ar₂ represents
 - 10 * a phenyl ring optionally substituted at the meta or para position with a halogen group, C1-C4 alkoxy group, cyano group, carbonylamino group optionally substituted with one or more C1-C4 alkyl groups, guanyl
 - 15 groups, C1-C4 alkylthio groups, amino groups, C1-C4 alkylamino groups, C1-C4 dialkylamino groups for each alkyl group, nitro group, alkyleneamino group or alkenyleneamino group
 - 20 * a mono- or bi- or tricyclic heterocyclic ring comprising 0 to 2 heteroatoms per ring provided that at least one heteroatom is present in at least one ring optionally substituted
 - 25 with one or more C1-C4 alkyl groups or with alkylene or alkenylene groups
- or one of its salts.

5. Compounds according to Claim 3, characterized in that Ar_1 and Ar_2 represent a group chosen from the following groups: 4-amino- or 4-methylamino- or 4-dimethylamino-quinolyl or 5 -quinolinium in which the quinolinium ring is optionally substituted with a methyl group.

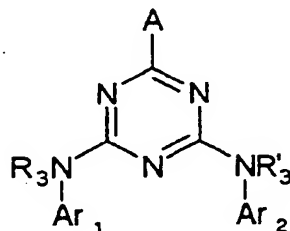
6. Compounds according to Claim 1, characterized in that the groups R_1 and R_2 represent the methylthio, amino, alkylamino or dialkylamino 10 radical, in which radicals the alkyl groups possess 1 to 4 carbon atoms.

7. Compounds according to Claim 2, characterized in that A represents a methylthio group.

8. Compounds of Claim 1, characterized in 15 that they have a telomerase-inhibiting activity.

9. Compounds according to any one of the preceding claims, characterized in that they have an anticancer activity.

10. Novel compounds corresponding to the 20 following formula (I):



in which:

- A represents

- an amino group of formula NR_1R_2 in which R_1 and R_2 , which are identical or different, represent a straight or branched alkyl group containing 1 to 4 carbon atoms or

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- a group OR_1 or SR_1 in which R_1 represents hydrogen or has the same meaning as above or

- an alkyl group containing 1 to 4 carbon atoms or a trifluoromethyl group or

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- a hydrogen atom or

- a halogen atom chosen from fluorine, chlorine, bromine or iodine

- R_3 and R'_3 , which are identical or different, represent independently of one another a hydrogen atom or a C1-C4 alkyl group

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- Ar_1 and Ar_2 , which are identical or different, represent

1. when Ar_1 and Ar_2 are identical:

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- a quinoline motif optionally substituted with at least one group $N(R_a)(R_b)$ in which R_a and R_b , which are identical or different, represent hydrogen or a short-chain alkyl and/or alkoxy radical containing 1 to 4 carbon atoms and/or

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- a quinoline possessing a nitrogen atom in quaternary form or

- a benzamidine except in the case where A represents diethylamine, hydrogen or an amine group
- a pyridine attached at the 4-position or fused with an aryl or heteroaryl group optionally substituted with a C1-C4 alkyl group

2. when Ar₁ and Ar₂ are different

- Ar₁ and Ar₂ both represent one of the possibilities mentioned above for Ar₁ and Ar₂ or
- Ar₁ represents one of the above possibilities and Ar₂ represents
 - * a phenyl ring optionally substituted at the meta or para position with a halogen group, C1-C4 alkoxy group, cyano group, carbonylamino group optionally substituted with one or more C1-C4 alkyl groups, guanlyl groups, C1-C4 alkylthio groups, amino groups, C1-C4 alkylamino groups, C1-C4 dialkylamino groups for each alkyl group, nitro group, alkyleneamino group or alkenyleneamino group
 - * a mono- or bi- or tricyclic heterocyclic ring comprising 0 to 2 heteroatoms per ring provided that at least one heteroatom is present in at

least one ring optionally substituted
 with one or more C1-C4 alkyl groups or
 with alkylene or alkenylene groups
 or one of its salts excluding 2-amino-bis-4,6-[(4'-
 5 amino-6'-quinaldiny1)amino]triazine dihydrochloride and
 2-amino-bis-4,6-(p-amidinoanilino)triazine
 dihydrochloride.

11. Compounds according to Claim 10,
 characterized in that when Ar₁ and Ar₂ are identical,
 10 Ar₁ and Ar₂ represent a group chosen from 4-amino- or 4-
 methylamino- or 4-dimethylamino-quinolyl or
 -quinolinium groups in which the quinolinium ring is
 optionally substituted with a methyl group.

12. Compounds according to Claim 10,
 15 characterized in that R1 and R2 represent hydrogen.

13. Compounds according to Claim 10,
 characterized in that A represents a methylthio group.

14. Compounds according to Claim 10,
 characterized in that when Ar₁ and Ar₂ are different

20 1. Ar₁ represents:

- a quinoline motif substituted with at
 least one group N(Ra)(Rb) in which Ra
 and Rb, which are identical or
 different, represent hydrogen or a
 25 short-chain alkyl or alkoxy radical
 containing 1 to 4 carbon atoms and/or
- a quinoline possessing a nitrogen atom
 in quaternary form or

- a benzamidine except in the case where A represents diethylamine, hydrogen or an amine group or
- a pyridine attached at the 4-position or fused with an aryl or heteroaryl group

2. Ar₂ represents

- * a ring as defined above but different or
- * a phenyl ring optionally substituted at the meta or para position with a halogen, methoxy, cyano, carbonyl-amino, guanyl, methylthio, amino, methylamino, dimethylamino, morpholine, alkyleneamino or alkenyleneamino group
- * a quinoline, benzimidazole, indole, benzothiophene, benzofuran, benzothiazol, benzoxazol, carbazol, quinazoline or quinoxaline ring optionally substituted with one or more C1-C4 alkyl groups or with alkylene or alkenylene groups

or one of its salts excluding 2-amino-bis-

4,6-[(4'-amino-6'-quinaldiny)amino]triazine dihydrochloride and 2-amino-bis-4,6-(p-amidinoanilino)-triazine.

15. Compounds according to Claim 10 chosen from:

- 2-amino-bis-4,6-[(1'-methyl-4'-amino-6'-quinaldinio)amino]triazine dichloride
- 5 - 2-amino-bis-4,6-[(1'-ethyl-4'-amino-6'-quinaldinio)amino]triazine dichloride
- 2-dimethylamino-bis-4,6-[(1'-methyl-4'-amino-6'-quinaldinio)amino]triazine dichloride
- 2-methylamino-bis-4,6-[(4'-amino-10 6'-quinaldiny]amino]triazine trihydrochloride
- 2-amino-bis-4,6-[(1'-methyl-6'-quinolinio)-amino]triazine dichloride
- 2-methylamino-bis-4,6-[(4'-methylamino-6'-quinaldiny]amino]triazine dichloride
- 15 trihydrochloride
- 2-amino-bis-4,6-[(9'-amino-10'-methyl-2'-acridinio)amino]triazine dichloride hydrochloride
- 2-methylthio-bis-4,6-[(1'-methyl-4'-amino-6'-quinaldinio)amino]triazine dichloride
- 20 - 2-chloro-bis-4,6-[(4'-dimethylamino-6'-quinaldiny]amino]triazine dihydrochloride dihydrate
- 2-methylthio-bis-4,6-[(4'-dimethylamino-6'-quinaldiny]amino]triazine hydrate
- N,N'-(4-amino-6-quinaldiny]urea
- 25 dihydrochloride
- N¹,N⁵-bis(7-chloro-1-methyl-4-quinolinio)-pentane-1,5-diamine diiodide

- bis-2,4-[(4'-amino-6'-quinaldiny1)amino]-
pyrimidine trihydrochloride pentahydrate

- 1,5-(4'-amino-6'-quinaldiny1)biguanide
trihydrochloride dihydrate.

5 16. Compounds according to Claim 15 chosen
from:

- 2-methylthio-bis-4,6-[(4'-dimethylamino-
6'-quinaldiny1)amino]triazine hydrate

- 2-chloro-bis-4,6-[(4'-dimethylamino-
10 6'-quinaldiny1)amino]triazine dihydrochloride dihydrate

- 6-[4-(4-amino-2-methylquinolin-6-ylamino)-
6-methylsulphanyl-[1,3,5]triazin-2-ylamino]-2-methyl-
quinolin-4-ol

- N6-[4-(4-dimethylamino-2-methylquinolin-
15 6-ylamino)-6-methylsulphanyl-[1,3,5]triazin-2-yl]-
2-methylquinoline-4,6-diamine

- N6-[4-(4-amino-2-methylquinolin-6-ylamino)-
6-methylsulphanyl-[1,3,5]triazin-2-yl]-2-methyl-
quinoline-4,6-diamine

20 - N6-[4-(4-methoxy-2-methylquinolin-
6-ylamino)-6-methylsulphanyl-[1,3,5]triazin-2-yl]-
4-methoxy-2-methylquinolin-6-amine.

17. Use of the compounds of Claim 10 as
pharmaceutical product for human use.

25 18. Therapeutic combinations consisting of a
compound according to Claim 1 and of another anticancer
compound.

19. Combinations according to Claim 18, characterized in that the anticancer compound is chosen from alkylating agents, platinum derivatives, antibiotic agents, antimicrotubule agents,
- 5 anthracyclines, group I and II topoisomerases, fluoropyrimidines, cytidine analogues, adenosine analogues, various enzymes and compounds such as L-asparaginase, hydroxyurea, trans-retinoic acid, suramine, irinotecan, topotecan, dexrazoxane,
- 10 amifostine, herceptin as well as oestrogenic and androgenic hormones.

20. Therapeutic combination consisting of a compound according to Claim 1 and of radiation.

21. Combinations according to any one of
- 15 Claims 18 to 20, characterized in that each of the compounds or treatments is administered simultaneously, separately or sequentially.